

calculating, using dedicated pixel shading computer hardware, a lighting equation to provide a shading value for substantially each drawn pixel residing on the polygon surface using the bump map and the interpolated light source direction vector, the dedicated computer hardware configured to produce a shading value using linear calculations and only mathematical functions selected from the group of addition, subtraction, multiplication and division whereby a display signal incorporating the shading values is generated without using a square root calculation.

2. (New) The method of claim 1 wherein the light source is point light source.
3. (New) The method of claim 2 wherein the step of interpolating includes interpolating a surface normal vector.
4. (New) The method of claim 3 wherein the step of calculating a lighting equation includes the use of a reference map which includes information useful in the determination of a shading value.
5. (New) The method of claim 4 wherein the step of calculating a lighting equation includes calculating a surface normal vector per pixel.
6. (New) The method of claim 5 wherein the surface normal vector is calculated using the bump map.
7. (New) The method of claim 6 wherein the bump map is contained at least partially in local texture memory.
8. (New) The method of claim 7 wherein a bump map vector is calculated for substantially each pixel.
9. (New) The method of claim 8 wherein the bump map vector is combined with the surface normal vector.

10. (New) A system for lighting surfaces in a rendering system comprising:  
a scene database including polygon information corresponding to a polygon with the polygon surface represented by three-dimensional vectors and light source information including a three-dimensional (3-D) light source direction vector;  
a bump map;  
a graphics processing unit including logic that rotates the light source direction vector to a (3-D) polygon orientation at each vertex and interpolates the rotated light source direction vector at each vertex, the graphics processing unit having dedicated pixel shading computer hardware to calculate a lighting equation to provide a shading value for substantially each drawn pixel residing on the polygon surface using the bump map and the interpolated light source direction vector, the dedicated computer hardware configured to produce a shading value using linear calculations and only mathematical functions selected from the group of addition, subtraction, multiplication and division whereby a display signal incorporating the shading values is generated without using a square root calculation.

11. (New) The system of claim 10 wherein the light source is a point light source.

12. (New) The system of claim 11 wherein the processing unit includes hardware logic that interpolates a surface normal vector.

13. (New) The system of claim 12 wherein the processing unit includes hardware logic operable to calculate a surface normal vector per pixel.

14. (New) The system of claim 13 wherein the processing unit includes hardware logic operable to receive information from the bump map to calculate the surface normal vector.

15. (New) The system of claim 14 wherein the bump map is contained at least partially in a local texture memory.

16. (New) The system of claim 15 wherein the processing unit includes hardware logic operable to calculate a bump map vector for substantially each pixel.

17. (New) The system of claim 16 wherein the process includes hardware logic operable to combine the bump map vector with the surface normal vector.

Respectfully submitted,



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